

NOVEMBER/DECEMBER 2023

GCM14/GCP13/DCM14/DCP13 —
ADVANCED BUSINESS STATISTICS

Time : Three hours

Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.



1. Define the term Partial 'Correlation'.
2. Write any two differences between correlation and Regression.
3. What is a binomial distribution?
4. Write any Two properties of Normal Distribution.
5. Define the term 'Hypothesis'.
6. Define Z Test.
7. Name any Two applications of Chi-Square test.
8. What does homogeneity mean in statistics?
9. What are the uses of F distribution?
10. What are the assumptions in ANOVA?

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL the questions.

11. (a) If $r_{12} = 0.75$, $r_{13} = 0.80$, $r_{23} = 0.70$. Find the Partial Correlation Coefficient $r_{13.2}$.

Or

- (b) Given that $r_{21} = 0.7$, $r_{23} = 0.85$ and $r_{13} = 0.75$ determine $R_{2.13}$.

12. (a) Explain in brief about the properties of Binomial Distribution.

Or

- (b) A man is known to speak truth 2 out of 3 times. He throws a die and reports that the number obtained is a four. Find the probability that the number obtained is actually a four.

13. (a) Describe in brief about testing a hypothesis.

Or

- (b) Find the t -test value for the following two sets of values: 7, 2, 9, 8 and 1, 2, 3, 4.

exam scores (%) are shown below for the three different groups:

Particulars	Memory drug	Placebo	No Treatment
	70	37	3
	77	43	10
	83	50	17
	90	57	23
	97	63	30
Mean	83.40	50.00	16.60
Variance	112.30	109.00	112.30
Grand Mean		50.00	
Grand Variance		892.14	

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. The following are the details of income and expenditure of 10 households.

Income: 40 70 50 60 80 50 90 40 60 60

Expenditure: 25 60 45 50 45 20 55 30 35 30

Determine the regression of expenditure on income and estimate the expenditure when the income is 65.

17. Enumerate the different types of probability distribution.

18. A department store, A, has four competitors: B, C, D, and E. Store A hires a consultant to determine if the percentage of shoppers who prefer each of the five stores is the same. A survey of 1100 randomly selected shoppers is conducted, and the results about which one of the stores shoppers prefer are below. Is there enough evidence using a significance level $\alpha = 0.05$ to conclude that the proportions are really the same?

Store: A B C D E

No. of shoppers: 262 234 204 190 210

19. A manufacturer of running shoes knows that the average lifetime for a particular model of shoes is 15 months. Someone in the research and development division of the shoe company claims to have developed a longer lasting product. This new product was worn by 30 individuals and lasted on average for 17 months. The variability of the original shoe is estimated based on the standard deviation of the new group which is 5.5 months. Is the designer's claim of a better shoe supported by the trial results? Please base your decision on a two tailed testing using a level of significance of $p < .05$.

20. The following are the details of plinth areas of ownership apartment flats offered by 3 housing companies A, B, C. Use analysis of variance to determine whether there is any significant difference in the plinth areas of the apartment flats.

Housing Company	Plinth area of apartment flats			
A	1500	1430	1550	1450
B	1450	1550	1600	1480
C	1550	1420	1450	1430

Use analysis of variance to determine whether there is any significant difference in the plinth areas of the apartment's flats.

14. (a) Explain about the test of goodness in chi square.

Or

- (b) A Sample of 10 is drawn randomly from a certain population. The sum of the squared deviations from the mean of the given sample is 50. Test the hypothesis that the variance of the population is 5 at 5% level of significance.

15. (a) Three different techniques namely medication, exercises and special diet are randomly assigned to (individuals diagnosed with high blood pressure) lower the blood pressure. After four weeks the reduction in each person's blood pressure is recorded. Test at 5% level, whether there is significant difference in mean reduction of blood pressure among the three techniques.

Mediation: 10 12 9 15 13

Exercise: 6 8 3 0 2

Diet: 5 9 12 8 4

Or

- (b) Students were given different drug treatments before revising for their exams. Some were given a memory drug, some a placebo drug and some no treatment. The